Standard Operating Procedure

Tetrafluoroethylene (gas)

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and
3) SOP has been signed and dated by the PI and relevant lab personnel.*

 Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** ☐ Process ☒Hazardous Chemical ☐ Hazardous Class

**Purpose**

Tetrafloroethylene is colorless **flammable** gas that is extremely **toxic** and **corrosive**. It can form **explosive peroxides**. It is also a potential **carcinogen**. Tetrafloroethylene is highly toxic, may be fatal if inhaled, swallowed or absorbed through skin. Tetrafloroethylene can polymerize to make polymers such as Teflon and Fluon.

Also known as Tetrafluorethene, Perfluoroethene, Perfluoroethylene or TFE.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 116-14-3

Class: **Very toxic, Carcinogen, Flammable gas, Peroxide forming**

Molecular Formula: C2F4

Form (physical state): Gas

Color: Colorless

Boiling point: -76.3 °C

**Potential Hazards/Toxicity**

Tetrafloroethylene is colorless **flammable** gas that is extremely **toxic** and **corrosive**. It can form **explosive peroxides**. It is also a potential **carcinogen**.

Exposure may cause severe irritation and burns to the eyes, mucous membranes and skin. Inhalation may cause dangerous retention of body fluid in the lungs, respiratory damage, and systemic toxicity.

Tetrafloroethylene can act as a simple asphyxiate by displacing air necessary for life. Irritating to the respiratory tract, eyes, and nose. Symptoms include rapid respiration, diminished mental alertness, fatigue, muscular incoordination and loss of consciousness.

Has the following permissible exposure limit data: 2 ppm TWA

**Personal Protective Equipment (PPE)**

**Respirator Protection**

Use a full-face respirator with multi-purpose combination (US) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL).
* As PPE in the event of a chemical spill clean-up process.

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Rubber protective gloves.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with tetrafloroethylene.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI-approved, tight-fitting safety glasses/goggles. Face shield recommended.

**Skin and Body Protection**

Flame-resistant lab coats must be worn and be appropriately sized for the individual and buttoned to their full length. Laboratory coat sleeves must be of sufficient length to prevent skin exposure while wearing gloves. Full-length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed.

**Hygiene Measures**

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Engineering Controls**

Handle using a chemical fume hood with good ventilation and electrically-grounded lines and equipment

**First Aid Procedures**

**If inhaled**

Remove immediately to fresh air. If not breathing, give artificial respiration. If breathing is difficult, provide oxygen. Seek medical aid immediately.

**In case of skin contact**

Remove contaminated clothing as rapidly as possible. Flush affected skin with plenty of water and mild soap. Seek immediate medical attention.

**In case of eye contact**

Persons with potential exposure should not wear contact lenses. Flush eyes with plenty of water for at least 30 minutes lifting lower and upper eyelids. Seek medical aid. Continue rinsing during transport to hospital.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Seek medical aid immediately.

**Special Handling and Storage Requirements**

**Precautions for safe handling:** **Highly flammable gas**, handle away from heat and sources of ignition. Avoid shock or friction. Avoid contact with skin and eyes and inhalation. Avoid inhalation of vapor or mist. Avoid formation of dust.

**Conditions for safe storage:** **Highly flammable gas**, store away from heat and sources of ignition. **Flammable** materials should be stored in a flammable storage cabinet. Keep in a dry place. Keep container tightly closed in a cool, dry, and well-ventilated area. Keep away from incompatible materials and conditions. Keep cool and protect from sunlight.

**Leak/Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends and Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life-Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Wearing proper PPE, decontaminate equipment and bench tops using soap and water. Dispose of the used chemical and contaminated disposables as hazardous waste.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with tetrafloroethylene, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

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